

Highly transitive groups

We say that a group action is 5-transitive, if for every two 5-tuples of distinct points there is a group action mapping one of the tuples to the other one. In this thesis, we will construct W_{12} and W_{24} Steiner systems as three-point extensions of the affine plane $AG_2(3)$ and the projective plane $PG_2(4)$. We will conclude that the automorphism groups of the systems, so called Mathieu groups M_{12} and M_{24} , are 5-transitive.